GITAM (Deemed to be University)
[20SCA803]
MCA Degree Examination

III Semester

DESIGN AND ANALYSIS OF ALGORITHMS
(Effective from the admitted batch 2020–21 & 2021-22)

Time: 3 Hours   **Max.Marks: 60**

Instructions: All parts of the unit must be answered in one place only.
                     Figures in the right hand margin indicate marks allotted.

Section-A

1. Answer all the Questions: (10×2=20)

    a)   Distinguish between Algorithm and Pseudocode.
    b)   Write the difference between Monte Carlo algorithms and Las Vegas Algorithm.
    c)   Define Spanning Tree
    d)   State the purpose of Dijkstra's algorithm. Give its general formula.
    e)   Define minimum cost tour.
    f)   Define Graph, Forest.
    g)   Define Biconnectivity
    h)   State Graph Coloring Problem.
    i)   How do you represent a sparse polynomial?
    j)   What is interpolation?

Section-B

Answer the following: (5×8=40)

UNIT-I

2.   a)   Write the General method of Divide and Conquer approach.   5

     b)   Explain the performance Analysis of Divide and Conquer approach.   3

3.   Define Big-Oh, Big-Omega and Big Theta Notations with examples.

UNIT-II

4.   Define the problem statement of fractional knapsack. Find an optimal solution for the below data using fractional knapsack algorithm. Given n=7 objects and the capacity of knapsack m=15. The profits are (P1,P2,P3, P4, P5, P6, P7)= (10, 5,15,7,6,18,3) and weights of the objects are (W1,W2,W3,W4,W5,W6,W7)= (2,3,5,7,1,4,1).

OR

5.   Give the difference between Prim's and Kruskal's Minimum Cost Spanning Tree algorithm. Derive the time complexity of Kruskal's algorithm.

UNIT-III

6.   Find minimum path cost between vertex s and t for following multistage graph using dynamic programming.
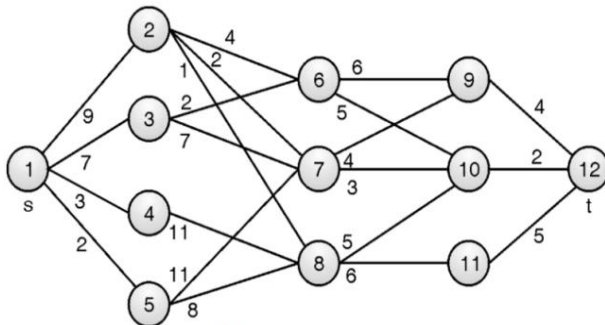
OR

7.   What is string editing? Explain about Longest common subsequence with an example.

UNIT-IV

8. Define Backtracking and explain the general method of Backtracking.

OR

9. Write a recursive backtracking algorithm to find the solution to color the graph.

UNIT-V

10. Explain 0/1 Knapsack problem using branch and bound technique.

OR

11. Solve the travelling salesperson problem for the given cost matrix. Investigate the travelling salesman solution using LC branch and bound and Reduced matrix method.

Vertex	1	2	3	4	5
1	α	20	30	10	11
2	15	α	16	4	2
3	3	5	α	2	4
4	19	6	18	α	3
5	16	4	7	16	α

[8/V S/122]